

REMARKS

This paper is filed in response to the non-final office action mailed on April 14, 2005.

Claims 1 and 19 have been amended; claims 12-14 have been canceled; claims 1-4, 7, 9 and 11, and 15-19 remain pending.

The Patent Office objects to claims 1 and 19 due to some informalities. In response, claims 1 and 19 have been amended to traverse these objections.

Turning to the rejections based on the prior art, the Patent Office rejects all claims under 35 U.S.C. 103 as being unpatentable over:

A. U.S. Patent No. 5,412,246 ("Dobuzinsky") in view of U.S. Patent No. 6,720,630 ("Mandelman"), U.S. Patent Publication No. 2002/0053711 ("Chau"), and Wolf, "Silicon Processing for the VLSI Era," ("Wolf") (claims 1-3, 7, 9-12 and 15); or

B. Dobuzinsky in view of Mandelman, Chau, Wolf and in further view of U.S. Patent No. 6,297,172 ("Lin") (Claim 4); or

C. Dobuzinsky in view of Mandelman, Chau, Wolf and in further view of U.S. Patent No. 6,297,172 ("Kashiwagi") (claims 13-14); or

D. Dobuzinsky in view of Mandelman, Chau, Wolf and in further view of U.S. Patent No. 6,320,238 ("Kizilyalli") (claim 16); or

E. Dobuzinsky in view of Mandelman, Chau, Wolf, Kizilyalli in further in view of U.S. Patent No. 6,274,429 ("Misra") (claims 17-18 and 19).

In response, independent claims 1 and 19 have been amended to require a step of performing an oxygen plasma treatment to form oxide films on sides of the conductive layer and not on the hard mask, wherein the oxygen plasma treatment is performed using oxygen and hydrogen, with a flow ratio of oxygen/hydrogen ranging from 0.01 to 0.2. In short, the limitations of now-cancelled claim 14 has been incorporated into independent claims 1 and 19. Support for the amendment is therefore found in original claim 14.

In rejecting claim 14, the Patent Office primarily relies upon Kashiwagi for the proposition that it discloses a plasma oxidation using hydrogen and oxygen at col. 9, lines 65-67 and at col. 18, lines 50-51. While col. 9, lines 65-67 of Kashiwagi teach the use of oxygen and hydrogen, *no flow ratios are suggested*. Further, applicants believe the Patent Office has mis-cited col. 18, lines 50-51 as this passage of Kashiwagi has nothing to do with

oxygen and hydrogen flow ratios. Instead, col. 18, lines 50-51 of Kashiwagi states: "These effects enable the production of a very thin oxide film having excellent electric reliability."

Thus, Kashiwagi does not teach or even suggest the flow ratio range of oxygen/hydrogen as recited in independent claims 1 and 19. Further, Kashiwagi does not teach or suggest the formation of the oxide films on sides of the gate pattern stack, that includes a polysilicon film, an anti-diffusion film and a metal film, and not on the hard mask, which is formed on top of the gate pattern, all as recited in independent claims 1 and 19.

Under MPEP §§ 2142 and 2143,

[t]o establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Citing, In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991); *see also* MPEP § 2143-§ 2143.03 for decisions pertinent to each of these criteria.

Because neither Kashiwagi nor Dobuzinsky nor any of the secondary references, Mandelman, Chau, Wolf, Lin, Kizilyalli or Misra teach or suggest the oxygen/hydrogen flow ratios of amended claims 1 and 19 in an oxygen plasma treatment to form an oxide film on sides of the conductive layer and not on the hard mask, no combination of the cited references teach every element of amended claims 1 and 19 and therefore no *prima facie* case of obviousness has been established.

In response to the previous final rejection of November 17, 2004, independent claims 1 and 19 were amended to require the formation of the oxide films on sides of the gate pattern stack, that includes a polysilicon film, an anti-diffusion film and a metal film, and not on the hard mask, which is formed on top of the gate pattern. Independent claims 1 and 19 were also amended to make it clear that the polysilicon film is treated with a HF solution to remove any native oxide prior to deposition of the anti-diffusion and metal films. These amendments effectively removed Dobuzinsky as a base reference and the remaining

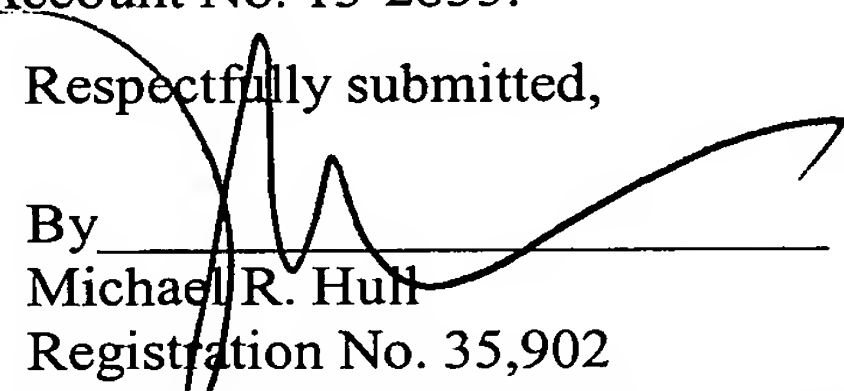
references at that time, Mandelman, Lin, Kizilyalli or Misra could not be used to establish a *prima facie* case of obviousness.

In response, the Patent Office now cites two additional references, Wolf and Chau. However, neither of these references teach anything about flow ratios of oxygen and hydrogen in an oxygen plasma treatment to form an oxide film on sides of the conductive layer and not on the hard mask as recited in amended claims 1 and 19. Thus, no combination of the prior art of record before the filing of the RCE or after the filing of the RCE teaches or suggests every element of amended claims 1 and 19 and there all obviousness rejections are improper and should be withdrawn. In summary, Kashiwagi does not teach the recited flow ratios and no *prima facie* case of obviousness has been established.

The Commissioner is authorized to charge any fee deficiency required by this paper, or credit any overpayment, to Deposit Account No. 13-2855.

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Respectfully submitted,

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